Comments on Volume 1 - ES, Chapter 1 and Chapter 2

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Vol1_Ch02_ImperativeToInvest.pdf (2 MB)

Here are the Santa Clara Valley Water District's comments on the California Water Plan Update 2013 Volume 1 Executive Summary, Chapter 1, and Chapter 2.



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Executive Summary

The California Water Plan: Investment in Innovation and Infrastructure

California water managers and elected officials are responsible for ensuring reliable and clean water supplies for a growing population, reducing flood risks to ensure public safety, and enhancing and restoring the state's ecosystems, all while safeguarding California's economy. These responsibilities exist

at a time when the demands placed on natural resource-based assets and services are increasing and while

funding for resource management is more and more limited. This necessitates doing more with less.

As mandated in the California Water Code, the California Water Plan (CWP) is the State's long-term strategic plan for guiding the management and development of water resources under these emerging conditions and expectations, and in the face of an uncertain future. *California Water Plan Update 2013* (Update 2013) provides a strategic vision and roadmap for California's water future that is informed and supported by hundreds of stakeholders; dozens of federal, State, and tribal entities; and nearly 40 other companion plans developed by myriad State agencies.

California Water Plan Vision

California has healthy, resilient watersheds and reliable and secure water resources and management systems. Public health, safety, and quality of life in rural, suburban, and urban communities are significantly improved as a result of advancements in integrated water management. The water system provides the certainty needed for quality of life, sustainable economic growth, business vitality, and agricultural productivity. California's unique biological diversity, ecological values, and cultural heritage are protected and have substantially recovered.

Update 2013 does not create mandates, prioritize actions, or allocate funding. Instead, it provides a roadmap that informs legislative action, as well as planning and decision-making, at all levels of government. It characterizes water resource conditions in the state today, describes the factors that are driving change, recognizes challenges and impediments to effective solutions, and lays out a comprehensive suite of potential future actions intended to move California toward more sustainable management of water resources and more resilient water management systems. Ultimately, sustainability and resiliency need to be measured in terms of improved public safety (societal benefits), environmental stewardship (environmental benefits), and economic stability (financial benefits).

PUBLIC SAFETY ENVIRONMENTAL STEWARDSHIP ECONOMIC STABILITY

- Reduce flood risk Statewide.
- Provide safe drinking water.
- Improve water quality for fisheries and recreation.
- Enhance Bay-Delta ecosystem.
- Restore terrestrial and aquatic habitats.
- Improve watershed management.
- Raise awareness and increase stewardship.
- Enhance State economic output.
- Contribute to job creation and security.
- Promote food production security.
- Provide stable funding for infrastructure.

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A Call for Action: Integration, Alignment, and Investment

Despite significant investments made in management and improvement of the state's natural and human-made water resource infrastructure over the past few decades, Californians today face rising and unacceptable risks from flooding, water shortages, unhealthy water quality, and ecosystem degradation. These challenges will only intensify in the future without bold action backed by stakeholder support. Many of California's ecosystems and much of our water supply and flood protection infrastructure are no longer functioning properly or have exceeded their life cycles. For example, many communities depend on aging water supply and flood management infrastructure badly in need of maintenance or replacement; many essential species and ecosystems are rapidly declining; and some Californians do not have access to safe, clean drinking water. To compound the situation, such stressors as climate change, earthquakes, and lack of stable funding further threaten the integrity and reliability of the state's water supply, flood protection, and environmental systems.

Update 2013's strategies and actions promote three themes to address the challenges facing California today: 1) advance integrated water management (IWM); 2) strengthen government agency alignment; and 3) invest in innovation and infrastructure. The themes are interconnected and work together.

Themes of 2013 California Water Plan

Integrated water management **Integrated Water Management** System flexibility and resiliency provides a set of principles Advocacy from implementers and financiers Delivery of benefits using fewer resources and practices that include **Government Agency Alignment** government agency alignment Clarification of state roles through open and transparent Reduction in implementation time and costs Efficient achievement of multiple objectives planning process. This leads to Investment in Innovation and Infrastructure stakeholder and decision-maker Stable and strategic funding Priority-driven funding decisions support for investment ... Equitable and innovative finance strategies in innovation and infrastructure.

Advance Integrated Water Management

With Update 2013, the State is renewing its commitment to IWM. IWM is a strategic approach to planning and implementing water management programs that combines flood management, environmental stewardship, and water supply actions to deliver multiple economic, environmental, and social benefits across watershed and jurisdictional boundaries. The IWM approach provides a set of principles and practices that strengthen government agency alignment and efficiencies through collaborative and transparent planning. This in turn promotes stakeholder and decision-maker support for cost-effective investments in multi-benefit projects and more diversified water portfolios. This support provides increased advocacy, as well as a greater number and variety of potential implementers and

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- 1 financiers. The result is more efficient, effective, and regionally appropriate water resource planning and
- 2 management that leads to higher returns on investment; actions with more sustainable outcomes; and
- 3 greater water system resiliency and adaptability to future challenges, such as growth and climate change.
- 4 The previous updates to the CWP introduced IWM as an effective approach to achieving more sustainable
- 5 management of the state's water resources. Update 2013 represents an important next step in advancing
- 6 IWM by articulating the outcomes or types of benefits of greatest value to stakeholders, and further
- 7 clarifying and defining the scope and focus of IWM as an outcome-based approach. Desired outcomes
- 8 include improved system flexibility and resiliency; increased advocacy for multi-beneficiary projects
- 9 from potential implementers and financiers; and delivery of benefits at a faster pace, using fewer
- 10 resources than are typically required to implement single-benefit projects. IWM and integrated regional
- 11 water management (IRWM) practices have made strides over the past 12 years, and Update 2013
- 12 encourages the expansion and enhancement of these practices.

Strengthen Government Agency Alignment

- 14 California has a wide variety of climates, landforms, and institutions, as well as a diverse, place-based
- 15 range of cultures, which can be described as anthrodiversity (e.g., the human aspect of biodiversity that
- 16 denotes the value of sustaining varied human habitats, such as rural, suburban, and urban communities).
- 17 For example, there are more than 2,300 public resource management agencies at four primary levels of
- 18 government (federal, State, regional, and local). Californians' disparate priorities, beliefs, practices, and
- 19 resource consumption rates define and support California's rich social diversity. The most effective and
- 20 efficient solutions are an amalgam of diverse input and data from a large variety of elected officials,
- 21 opinion leaders, stakeholders, scientists, and subject experts. These circumstances necessitate that data
- 22 management, planning, policy-making, and regulation occur in a more collaborative, regionally
- 23 appropriate manner. Sustainable outcomes will rely on a blend of subject expertise and perspectives
- 24 woven together into comprehensive place-based and regionally appropriate policies and projects.
- 25 Discussions regarding water management priorities, including how they should be funded, often devolve
- 26 into conflict, often with stakeholders or decision-makers operating from different sets of information
- 27 prepared for disparate purposes. In most cases, the information is accurate but can be incomplete, drawn
- 28 out of context, or based on fundamentally different assumptions. The outreach and collaboration process
- 29 of Update 2013 has attempted to translate these different perspectives into practical information to enable
- 30 decision-making and expedite implementation. For example, the future scenarios described in Chapter 5,
- 31 "Managing an Uncertain Future," provide a framework for making common assumptions and applying
- 32
- analytical tools to align understanding of possible future water conditions across diverse stakeholder
- 33 interests. This type of collaborative planning has yielded well-supported, implementable
- 34 recommendations.

- 35 Update 2013 builds on strategies and actions to strengthen agency alignment from that presented in
- 36 California Water Plan Update 2009 (Update 2009). The primary purpose for improving alignment among
- 37 and within federal, State, tribal, and local government agencies is to expedite implementation of resource
- 38 management strategies and help assure efficient implementation of multi-benefit projects. (Refer to
- 39 Volume 1, Chapter 4, "Strengthening Government Alignment," for a more detailed discussion.)

Invest in Innovation and Infrastructure

How California decides to prioritize and pay for necessary water resource management improvements is one of the most significant issues the state faces today. Past investments have provided a down payment and a good basis for further improvements; however, the financing methods of the past are no longer sustainable. The stakes are high as future investment decisions will significantly affect public safety, environmental stewardship, and economic stability. What is at stake includes flood risk to Californians' lives and assets; sustainability of natural resources, including the stewardship or extinction of species/habitats and the ecosystem services they can provide; and California's \$2 trillion economy, which has significant value, both nationally and globally, and directly affects the fate of existing businesses, their employees, and their employees' families.

California has nearly \$600 billion of assets and over 7 million people at risk of flooding. There are also over 10,000 projects identified within the 48 IRWM plans. In total, resource management actions will require up to \$500 billion of future investment over the next few decades to reduce flood risk, provide reliable and clean water supplies, and enhance ecosystems and their services. The price tag is daunting, but failure to address these challenges will put more and more Californians at risk. We are beginning to integrate resource management and planning, but funding remains fragmented, unstable, and inefficient, which limits opportunities for further integration. In fact, many current funding practices/constructs, developed decades ago, drive investment priorities more so than emerging plans and stakeholder priorities (which have significantly changed over the last several decades). These rigid funding constricts also do not allow the adaptability necessarily to respond to emerging challenges.

Update 2013 calls for more strategic, disciplined, and aligned investments in innovation and infrastructure (both naturally occurring and human-made) and identifies shared stakeholder values and potential mechanisms for future financing. Moving forward, the State needs to clarify funding purposes, as well as assess and articulate the value of current and future expenditures, to secure the necessary investments that will deliver sustainable and resilient water resources. It will take decades to upgrade the aging water-related infrastructure and accomplish ecosystem improvements. However, we need to continue taking steps toward financing implementation of a diverse portfolio of water management actions with an equally diverse portfolio of funding sources, including self-funding, cost-sharing, and public benefit.

Project type	Funding type		
Self-Funding Programs supported through local users' fees	local 🔽		
Cost-Sharing Programs supported through a combination of local and public funding	local public		
Public Benefits Programs supported through public funding (State or federal)	public		

Self-Funding programs are primarily financed through revenue bond sales that are supported through users' fees. Many local major water-supply projects, including local and regional water-supply conveyance, treatment, distribution, and wastewater treatment, are included in this category. Some systemwide projects can also be included in this category. Small and isolated disadvantaged communities



are one exception, as many of their water supply systems need upgrades to provide adequate water supply and/or address their water quality issues. Typically, local/regional water purveyors' and wastewater agencies' user fees, with some exceptions, provide adequate funding for operation and maintenance of their water systems. Nonetheless, operation and maintenance of the flood management system by the State and local flood assessment districts is more challenging.

Cost-Sharing programs have local and regional benefits, as well as State and national benefits. Many of the proposed infrastructures fit within this category and are generally funded through a cost-shared agreement among the federal, State, and local agencies, depending on the program/project beneficiary. Examples of these types of projects include some regional water supply security projects and most flood protection projects. Many flood and community districts sell bonds secured by specific tax assessments to fund their capital improvements. Passage of Assembly Bill 218 in 1996 put new restrictions on this type of financing by requiring approval by two-thirds of voters. The result has been delays in some capital improvements and failure to approve others.

Public benefit programs have statewide and societal benefits. They are generally supported by State and federal public funding. Examples of these projects are the systemwide ecosystem enhancements, systemwide flood-risk reduction projects, and some watershed management programs. Cities, counties, and the State generally finance their capital improvement programs through General Obligation bonds, which are secured by full faith of the credit issuer. Many local agencies and disadvantaged communities may not have adequate funding or means of financing local shares of their infrastructure improvement through bond sales (i.e., lack of credit or high interest rates). In these cases, providing low-interest State and/or federal loans to local agencies to cover their local cost share of the project will be helpful.

Integrated Water Management in Action

The immediate and changing conditions, priorities, and challenges described in Update 2013 require that Californians step up existing efforts to provide integrated, reliable, sustainable, and secure water resources and management systems for our health, public safety, economy, and ecosystems — today and for generations. The State needs to continue to invest in innovation and infrastructure, as detailed in Chapter 7, "Finance Planning Framework." To accomplish this requires implementing a strategic water plan with vision and goals, and an implementation plan with objectives and near-term and long-term actions. The plan must build on State and stakeholder accomplishments since Update 2009, as well as the fundamental lessons of water resource management learned in recent years. The figure below emphasizes how State, regional, and local entities must come together (align) to deliver the resources needed to effectively implement (invest in) IWM actions. Several key IWM activities are summarized (in the arrows located on the left side of the figure, "Integrated Water Management in Action") for State, regional, and local government roles and investment. The roles of the respective government entities cannot be accomplished without significant new collaboration and alignment, particularly regarding international, interstate, statewide, and interregional IWM activities.

The outcomes shown in the circle represent key accomplishments that must occur to achieve the Update 2013 IWM vision and objectives. Volume 1, Chapter 8, lays out 17 objectives and a menu of more than 250 actions that can move California toward accomplishing the desired outcomes. These outcomes will be tracked in future CWP updates and can be used to help guide, prioritize, track, and adaptively manage future State investment in IWM actions. Alignment, interaction, cooperation, and collaboration (shown around the figure's circle) provide the catalyst needed for sustainable resource management.

Integrated Water Management in Action

State, regional, and local entities must come together to effectively implement IWM actions. These roles cannot be accomplished Alignment, interaction, cooperation, and collaboration (shown without significant new collaboration and alignment, particularly regarding around the circle) provide the catalyst needed for sustainable international, interstate, statewide, and interregional IWM activities. resource management. Implement & operate large-scale infrastructure ALIGNMEN Represent California in government-togovernment interactions ERNMENT IWM ROLE & INVESTMENT Public awareness of • State funding Protect public trust linked to planning flood & drought risks priorities Meet basic public health & safety needs for all Californians State government Broad-based role clarified to funding sources for Provide planning, policy research, & technical and financial assistance SUSTAINABLE multi-benefit projects advance IWM Government policy, Return on RESOURCE planning & investment & **MANAGEMENT** regulation alignment performance **Environmental management** reporting Outcome-based OHAL AND LOCAL IWM ROLE & INVESTMENT regulatory State funding Emergency management approaches contingent on demonstrated Greater funding Land use planning value reliability Deliver services to end users COLLABORATIO Plan & implement projects Implementing the IWM roadmap is contingent on reliable State, federal and local investment in These nine desired outcomes will be tracked in future CWP innovation and infrastructure. updates and can be used to help quide, prioritize, track, and adaptively manage future State investment in IWM actions.

Navigating the California Water Plan

While the entirety of Update 2013 is intended to inform the actions of water managers, the *Highlights*

- 3 booklet (to be available in early 2014) and certain Volume 1 chapters are particularly helpful in advising
- 4 future policies with a concise description of the water management needs facing California and with 5
- implementable recommendations to help accomplish the Update 2013 vision. Chapter 1, "Planning for
- 6 Environmental, Economic, and Social Prosperity," provides a concise call for action from policy-makers, as
- 7 well as a summary of major concepts that advance the State's commitment to IWM. Chapter 2, "Imperative
- 8 to Invest in Innovation and Infrastructure," describes extensive conversations with stakeholders about the
- 9 role of State government in IWM, the three themes for Update 2013, and how these themes can be used to
- 10 support decisions. These conversations and the close collaboration with stakeholders, which used the vision,
- 11 mission, goals, and principles as a compass, were instrumental in crafting the abovementioned 17 objectives
- 12 and 250+ related actions discussed in Chapter 8, "Roadmap For Action." Chapter 8 also describes the vision
- 13 and mission of Update 2013, IWM goals to help identify and prioritize future water management actions,
- 14 and guiding principles to help planning and decision-making.
- 15 Even though the 17 objectives and the related actions are supported by hundreds of stakeholders and dozens
- 16 of State agencies, they must be prioritized for implementation. These actions are intended to provide policy
- 17 and lawmakers, resource managers and land use planners, communities and businesses, academia, and other
- 18 water leaders with a foundation and framework for water planning and management, policies and practices,
- 19 and public and private investments. They are also intended to inform legislative action for change.
- 20 To assist water managers with implementing these objectives and related actions, a "toolbox" of 30
- 21 resource management strategies is provided in Volume 3 of Update 2013. Federal, State, tribal, and local
- 22 entities are encouraged to use these tools to advance IWM, strengthen agency alignment, and invest in
- 23 innovation and infrastructure.

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- 24 Integral to achieving the goals and objectives in Chapter 8, Chapter 7 provides a first-of-its-kind finance
- 25 planning framework in which multiple requirements, perspectives, and previously non-integrated financing
- 26 information can be considered. This framework is intended to be used as a cornerstone for stakeholders and
- 27 policy-makers to work collaboratively through critical funding needs and issues, develop durable finance
- 28 mechanisms, and identify reliable revenue sources.
- 29 The remaining chapters of Volume 1 (Chapters 3, 4, 5, and 6) provide the background and rationale for the
- 30 actions described in Chapter 8.

Conclusion

- 32 Update 2013 provides a full description of California's planning backdrop and context, a call for action, and
- 33 a recommended path toward sustainable water management. Update 2013 was crafted with extensive
- 34 collaboration; it represents matters of most importance and urgency to stakeholders and several State
- 35 agencies. The plan provides an actionable blueprint for California's water future. When combined with the
- 36 planning backdrop and context, the Update 2013 "Roadmap For Action" provides practical, well-reasoned,
- 37 and critical decision support that can be readily implemented by the governor, Legislature, and water
- 38 leaders.

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Chapter 1. Planning for Environmental, 1 **Economic, and Social** 2 **Prosperity**

About This Chapter

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- The California Water Plan (CWP) is the State's strategic plan for managing and developing water resources statewide. The CWP is required by the California Water Code but does not create mandates or authorize funding. This chapter provides an overview of California Water Plan Update 2013 (Update 2013), the 11th in a series of such plans prepared since 1957. Specifically, the chapter begins with a summary of the water resource issues facing the State — a call for action. The remainder of the chapter summarizes major concepts that advance this plan beyond California Water Plan Update 2009 (Update 2009), significantly advancing the State's commitment to integrated water management (IWM).
- 12 Readers are encouraged to review the Update 2013 "Document Guide" within this volume to learn more 13 about the organization of the various contents and topics contained in Update 2013.

A Call for Action

- 15 Despite significant physical improvements in water resource systems and in system management over the 16 past few decades, we still face unacceptable risks from flooding, unreliable water supplies, continued 17 depletion and degradation of groundwater resources, and habitat and species declines. Our interconnected 18 system for using and managing water is extremely complex and subject to continually changing natural 19 and human-made conditions. Moreover, our water resources provide critical support for the success of 20 other dynamic systems: our ecosystems, social systems, and economic and market systems. However, 21 many types of ecosystem services and infrastructure are no longer functioning or have exceeded their life 22 cycles. For example, some Californians do not even have safe, clean water supplies.
 - Collectively, our biggest problem may be how we pay for necessary water resource management improvements. Past successful investments in water use efficiency, groundwater management, flood management, ecosystem improvements, and many other important resource management actions have provided a down payment and a good basis for further improvements. However, investments in our water resources have not been stable or effective enough to maintain, much less improve, our personal safety, financial stability, and way of life. Given the current global financial problems, strapped government budgets (local, State, and federal), and the State's high indebtedness and reduced ability to pay, it is unlikely that California can afford all necessary system improvements. Prioritization that reflects our values will be the key to making investments.
 - California still depends on many remnants from World War II-era investments and innovations (e.g., dams and canals). This practice is borrowing against opportunities for our future prosperity. If this practice continues, some degree of foreclosure on our future prosperity will occur in the form of societal catastrophes such as floods, droughts, and species/habitat extinction. Because our water resource system is very complex, making further improvements is complicated by several issues and challenges:
 - A growing population, which may increase flood risk and water demands.
 - Diversity in societal needs, priorities, and expectations.

1 • Habitat and species declines. 2

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- Degraded surface water and groundwater quality.
- Declining groundwater levels.
- High ground ater depletion rates (and resulting land subsidence) in some areas of the state.
- Sustained drought conditions in the western United States.
- Seasonal, year-to-year, and geographical variability between water sources and locations of water
- Uncertainties about current and future climate change impacts on floods, groundwater and surface water supplies, ecosystems, and sea level.
- Aging and obsolete water infrastructure.
- System maintenance that has been deferred because of lack of funding or difficulty in meeting regulations.
- Sporadic funding that ebbs and flows with the occurrence of floods or droughts and that lacks the predictability and reliability required for effective implementation.
- General obligation bond debt levels that are near an all-time high.
- Misaligned, complex, and often internally inconsistent government planning, policy, and
- Conflicting roles and responsibilities related to overlapping and narrow authorities and governance.

20 **ECONOMIC STABILITY PUBLIC SAFETY ENVIRONMENTAL STEWARDSHIP**

- 21 Reduce flood risk Statewide.
 - Provide safe drinking water.
 - Improve water quality for fisheries and recreation.
- Enhance Bay-Delta ecosystem.
- Restore terrestrial and aquatic habitats.
- Improve watershed management.
- Raise awareness and increase stewardship.
- Enhance State economic output.
- Contribute to job creation and security.
- Promote food production security.
- · Provide stable funding for infrastructure.
- 25 These issues place significant risks on public safety, unique ecosystems, and the vital California
- 26 economy. Everyone in California is affected to some degree by these issues and will benefit from system
- 27 improvements that reduce impacts. For example, even if a given home is not inundated during a flood, the 28
- home's owner may not be able to get to work or may experience a disruption in services. And, as 29 ratepayers and taxpayers, California's citizens are affected by damages and business disruptions as the
- 30 State invests to recover from the disaster.
 - The stakes are immense, as future investment decisions will significantly affect:
 - Future levels of flood risk to people's lives and assets.
 - The sustainability of natural resources (including the potential prosperity or extinction of species/habitats and the ecosystem services they provide society).
 - The sustainability and efficiency of surface water reservoirs and groundwater basins to provide reliable water supply to meet municipal and agricultural demands, and support ecosystem services.

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- Types and levels of economic activity (including the fates of existing businesses, as well as the fates of employees and their families).
- California's \$2 trillion economy, which has significant value both nationally and globally but is dependent on effective local, State, federal, and private natural resource policies and practices.

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- In recent years, regional and local entities have been investing in water resources management at a rate of
- about \$18 billion per year. This constitutes the majority of the statewide investments, which total about \$22 billion per year in local, State, federal, and private expenditures (more information and citations to
- source materials can be found in Chapters 2 and 7 within this volume and in Volume 4). This regional
- 9 focus for water resource planning and implementation begs for a better definition of the role of State
- 10 government in supporting regional activities and in promoting statewide policies and initiatives that
- 11 recognize differences in needs from region to region. Investments in innovation and infrastructure (water
- 12 system and ecosystem) need to focus on regionally derived, multi-objective actions; consider all resource
- 13 development costs; and be fairly allocated among beneficiaries.
- 14 State, federal, and local agencies need to step up efforts to enhance California's business and finance
- 15 climate by increasing the certainty that flood damages will be averted, that surface water and groundwater
- 16 supplies will be reliable and predictable, and that recreational opportunities and environmental
- 17 sustainability will be improved. Beginning with the three themes presented in the next section, Update
- 18 2013 provides a guide for strategic planning and investment that helps planners and policymakers
- 19 overcome the complicated physical and institutional barriers to effective water resource management
- 20 described earlier in this chapter.

Themes for Update 2013

- 22 Update 2013 contains a large variety of information, in five volumes. Although these volumes contain
- 23 many refinements from Update 2009, Update 2013 also has significantly advanced the State's strategic
- 24 plan in three critical areas. To address challenges and build upon past successes, Update 2013 focuses
- 25 additional planning and recommendations regarding (1) IWM, (2) government agency alignment, and (3)
- 26 strategies to invest in innovation and infrastructure.
- 27 These three topics can be considered themes for creating the strategic plan contained in Update 2013 (see
- 28 Figure 1-1). These themes are interconnected and are never considered separately. IWM provides a set of
- 29 principles and practices that include government agency alignment (and hence efficiency) through a
- 30 collaborative and transparent planning process. This leads to stakeholder and decision-maker support for
- 31 focused, cost-effective investment in various aspects of resource management. The Update 2013 strategic
- 32 plan embraces these three themes as the basis for developing tools, plans, and actions and achieving
- 33 results. Society's willingness and ability to pay for all government functions and services is decreasing, so
- 34 these themes do not necessarily call for increased investment so much as for smarter, more efficient, and
- 35 more effective planning and investment.

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The following sections provide a summary of each of the three themes that advance Update 2013 beyond Update 2009.

PLACEHOLDER Figure 1-1 Themes of California Water Plan Update 2013

39 [Any draft tables, figures, and boxes that accompany this text for the public review draft are included at 40 the end of the chapter.]

1 **Integrated Water Management**

- 2 The first theme for Update 2013 is to build upon the foundation for IWM presented in Update 2009. IWM
- 3 is a strategic approach to planning and implementing water management programs that combines flood
- 4 management, environmental stewardship, and surface water and groundwater supply actions to deliver
- 5 multiple benefits across watershed and jurisdictional boundaries.
- 6 IWM and integrated regional water management (IRWM) practices have made strides over the past 10
- 7 years, and Update 2013 encourages continuation and expansion of these practices. Chapter 2 of this
- 8 volume, "Imperative to Invest in Innovation and Infrastructure," elaborates on the application of IWM in
- 9 prioritizing future investments.
- 10 Update 2013 further clarifies and defines (using an outcome-based approach) the scope and focus of
- 11 multi-objective IWM. Key IWM outcomes include improved system flexibility and resiliency, increased
- 12 advocacy for multi-beneficiary projects from potential implementers and financiers, and delivery of
- 13 benefits at a faster pace, using fewer resources than is possible from single-benefit projects.

14 Government Agency Alignment

- 15 The second theme for Update 2013 is to improve government agency alignment, a key process necessary
- 16 for successful IWM. Update 2013 includes alignment strategies and actions to build on this concept that
- 17 was introduced in Update 2009.
- 18 The primary purpose for better aligning local, State, and federal government agencies is to expedite the
- 19 implementation of resource management strategies (RMSs) (see Volume 3) and help ensure efficient
- 20 achievement of multiple objectives. This includes collaboration with regulatory agencies to reduce the
- 21 time and costs required to implement IWM projects. Alignment would not alter agencies' authority or
- 22 responsibility, but it would facilitate agencies working better together.
- 23 Currently, project implementers must navigate and comply with California's labyrinth of laws and
- 24 regulations, developed by multiple agencies that sometimes operate in silos. This can lead to project
- 25 delays and mounting planning and compliance costs. These challenges ultimately create significant
- 26 difficulties in meeting basic community safety and water supply needs and also create difficulties in
- 27 meeting the goals outlined in the CWP. It is important to acknowledge that regulations also provide basic
- 28 community safety and water supply needs and help meet many CWP goals. Update 2013 promotes
- 29 innovation for all IWM tools, including regulation and administrative tools.
- 30 At the same time, planning a project within the current regulatory environment is very technically and
- 31 administratively complex, making it difficult for a single entity to comprehend all aspects of resource
- 32 management and planning. For example, California has a wide variety of climates, landforms, and
- 33 institutions, as well as a very diverse, place-based range of cultures that can best be described as
- 34 constituting anthrodiversity (e.g., the human aspect of biodiversity that denotes the value of varied human
- 35 habitats, such as rural, suburban, and urban communities) (see Chapter 3 of this volume, "California
- 36 Water Today"). Accordingly, data management, planning, policymaking, and regulation must occur in a
- 37 very collaborative manner, with the ultimate product being a composite of input and data from a large
- 38 variety of elected officials, thought leaders, stakeholders, scientists, and subject experts.
- 39 Strides have been made to improve alignment, such as the formation and engagement of the CWP's State
- 40 Agency Steering Committee and Federal Agency Network and of 48 regional water management groups.

- 1 However, local, State, and federal governments simply do not collaborate enough (and hence are often not 2 aligned) to effectively manage the complexities described above. Impacts of insufficient alignment 3 include the fact that planning and permitting of projects frequently exceed the implementation and 4
- operational costs for many infrastructure and ecosystem enhancement activities. In many cases, program 5 and project implementation have yet to occur despite decades of planning activities.
- 6 Government agencies must institute a more coordinated, crosscutting, outcome-based, and regionally
- 7 appropriate approach to achieve desired outcomes. The Update 2013 process was also designed to provide
- 8 timely and meaningful participation by stakeholders. Update 2013 continued to develop new efforts to
- 9 communicate, share information, and obtain feedback from California Native American tribal
- 10 governments, federal agencies, topic-based caucuses, communities, academia, individuals, and
- 11 organizations.

12 Investment in Innovation and Infrastructure

- 13 The third theme for Update 2013 is to create more stable and disciplined/strategic investment in
- 14 innovation and infrastructure. A stable, effective funding stream is an essential component for successful
- 15 water resource implementation. One of the most significant new features of the Update 2013 is a
- 16 description of principles and strategies for future water financing.
- 17 In California, nearly \$600 billion in assets and more than 7 million people are at risk of flooding. There
- 18 are also several thousand water supply projects and other types of projects identified within the 48 IRWM
- 19 plans, urban water management plans, and capital improvement plans. In total, resource management
- 20 actions would require hundreds of billions of dollars of investment over the next few decades to reduce
- 21 flood risk, provide reliable and clean water supplies, reverse degraded and declining groundwater basins
- 22 and contain localized and regional land subsidence, and enhance ecosystems and their services. Funding
- 23 for these investments remains fragmented, unstable, and inefficient, which limits opportunities for further
- 24 integration. In addition, general obligation bond debt is near record levels.
- 25 Chapter 3 of this volume, "California Water Today," details existing local, State, and federal IWM
- 26 spending and debt levels. Historically, projects that tend to be the most implementable, the most
- 27 consistent with priorities of a particular funding source — or that happen to be at the front of the queue
- 28 when money becomes available — were often not linked to multifaceted strategic objectives. The
- 29 approach used for Update 2013 promotes proactive planning and prioritization of activities to drive future
- 30 investment decisions and funding. See Chapter 7 of this volume, "Finance Planning Framework," for a
- 31 description of finance strategies, including general obligation bonds, fees, taxes, and public private
- 32 partnerships.
- 33 Two primary categories of investment are innovation and infrastructure. Innovation includes planning and
- 34 prioritization improvements, such as the development of new analytical tools. Infrastructure includes
- 35 structures and facilities that support human activities, but it also includes green infrastructure (e.g.,
- 36 wetlands, riparian habitat, and watershed systems). Both innovation and infrastructure must include initial
- 37 upfront costs and long-term operation and maintenance costs, which have often been an afterthought to
- 38 implementation and not adequately financed over a project's useful life. Although innovation investments
- 39 would help make better decisions and guide infrastructure investments, innovation would cost orders of
- 40 magnitude less than infrastructure. This indicates that strategic investment in innovation can produce a
- 41 very high return on investment over the long term by identifying the most cost-effective, robust, and
- 42 beneficial solutions prior to making large capital investments.

1 Through intensive collaboration with the Update 2013 Finance Caucus, the investment categories 2 presented in Box 1-1 helped participants toward a common understanding of potential investments. This 3 approach can be used for aligning funding and finance planning processes across more than 2,300 local, 4 State, and federal government agencies, each with its own planning processes and scales.

PLACEHOLDER Box 1-1 State Integrated Water Management Investment Categories

Any draft tables, figures, and boxes that accompany this text for the public review draft are included at the end of the chapter.]

Guide to Update 2013 Documents — Foundational and New Features

- 9 California Water Plan Update 2005 (Update 2005) marked a change in how the State prepared the CWP.
- 10 For the first time, the document included a strategic plan prepared in a collaborative process that brought
- 11 together DWR with an advisory committee representing urban, agricultural, and environmental interests.
- 12 Update 2005 was the first CWP to explicitly include a strategic plan with a vision, a mission, goals,
- 13 recommendations, and an implementation plan. Update 2009 updated and expanded these strategic plan
- 14 elements. Update 2013 further updated the strategic plan.
- 15 Since the structure of these previous plans has proven useful, several foundational components have been
- 16 continued for Update 2013 (see Figure 1-2). Foundational components include topics required by statute,
- 17 as well as recurring features that were identified by stakeholders and CWP users as useful and important
- 18 to maintain continuity across updates. All volumes continuity material that has been updated since Update
- 19 2009 was released.

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20 PLACEHOLDER Figure 1-2 Foundational Components of California Water Plan Update 2013

[Any draft tables, figures, and boxes that accompany this text for the public review draft are included at the end of the chapter.]

Update 2013 presents the strategic plan in Volume 1. Within it, Chapter 2, "Imperative to Invest in Innovation and Infrastructure," elaborates on the three themes introduced in Chapter 1 and describes the conditions and challenges that constitute an urgency to act. It also lays out the future role of State government in IWM. Chapter 3, "California Water Today," includes a comprehensive description of current conditions, challenges, and initiatives for managing California's extreme and variable resources. Chapter 3 also details water uses and supplies (water portfolios) on a statewide basis. Moreover, a central feature of Update 2013 is the oversight of a 28-member State Agency Steering Committee. The steering committee's membership represents the complex and many-faceted nature of governing California's water resources at the State level. The committee's participation helped identify companion State plans that have a direct connection with the CWP, as discussed in **Chapter 4**, "Strengthening Government **Alignment.**" The approach to defining and examining numerous future resource management scenarios through 2050 is outlined in Chapter 5, "Managing an Uncertain Future." Chapter 5 summarizes potential future water demand and supply conditions and evaluates the use of RMSs for three hydrologic regions (RMSs are covered in Volume 3 of Update 2013, and California's hydrologic regions are covered in Volume 2). Chapter 6, "Integrated Data and Analysis: Informed and Transparent Decision-Making," contains information and data analysis, as well as key actions, needed to improve and implement strategies for use of water resources. Chapter 7, "Finance Planning Framework," a new part of Update 2013, presents an approach for prioritizing State IWM investments, the role of State government and public funding, an estimate of future investments, and several strategies for financing improvements. Chapter 8, "Roadmap For Action," sets forth the strategic vision, goals, objectives, and

- 1 principles that guided the preparation of Update 2013 and that provide the ideals for its implementation.
- 2 This chapter also describes the future actions required to implement Update 2013 and related IWM plans.

3 Enhancements to Update 2013 — Adapting to Changing Decision-4 **Support Needs**

- 5 Update 2013 builds on and advances the evolution in planning that began with the Update 2005 process.
- 6 As described earlier in this chapter, the major enhancements for Update 2013 compared with Update 2009
- 7 are the emphasis on the three overarching themes of IWM, government agency alignment, and investment
- 8 in innovation and infrastructure.
- 9 In addition, during the Update 2013 scoping process in 2010, the many advisory bodies and the public 10 suggested enhancements for Update 2013. The suggestions can be broadly grouped into five categories, 11 for improvements in:
 - New and expanded topics.
 - Regional planning.
- 14 • Collaboration.

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- Data, metrics, and analyses.
- 16 Adaptive management.
- 17 Detailed descriptions of each proposal are provided in Volume 4, Reference Guide. Although all
- 18 proposals for enhancements could not be accommodated within the scope of Update 2013, they serve as a
- 19 starting point for scoping the next update of the CWP, to be released in 2018.
- 20 After an extensive collaborative process of screening and prioritization, the following enhancements for 21
- Update 2013, identified as critical for ensuring relevant and useful decision support, have been 22
- incorporated into the strategic plan by Update 2013 staff and stakeholders. 23
 - New and expanded topics:
 - o Finance planning framework.
 - A. Critical State investment priorities for water supply, water quality, flood planning and management, and environmental stewardship activities were identified.
 - B. Innovative, stable, equitable, and fiscally responsible financial strategies and revenue sources were recommended.
 - New resource management strategies (RMSs) New RMSs were added for sediment management, outreach and education, and water and culture.
 - **Flood management** Flood management, in the form of IWM, was incorporated throughout the CWP. This effort included thorough incorporation of the report California's Flood Future: Recommendations for Managing the State's Flood Risk, which presents a call to action and recommendations for reducing flood risk statewide.
 - **Surface and groundwater quality** Regional and statewide water quality challenges were highlighted, and strategies were recommended to protect and improve water quality to safeguard public health and the environment and to improve water supply reliability.
 - **Groundwater conditions and management** Data, basin descriptions, and other information about statewide and regional groundwater conditions and change in storage were expanded, and existing groundwater governance structures were evaluated for better understanding of groundwater management alternatives and, ultimately, more informed decisions.

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statewide and regional water technology needs, opportunities, and challenges for implementing new technologies in California. Development of Update 2013 was supported through in-depth discussions and deliberations of innovation, technology, applied research, science, and development topics and issues.

Water technology and science — Information was identified and expanded relating to

Regional planning:

- Emphasis on planning at a regional scale Regional outreach was expanded, the scope of regional reports was increased to include regional RMSs, two-page summaries of regions were included in Update 2013's "Highlights," and recognition of IRWM plans and priorities was increased.
- **Near-coastal resources** Topics and issues were added to include near-coastal interfaces with regard to several issues with a nexus to the management of fresh water, such as: desalination brine disposal, the influence of freshwater runoff in near-coastal ocean environments, and the interface of ocean and freshwater habitats (i.e., anadromous fisheries).

Collaboration:

- **Expanded outreach and collaboration** Seven topic-based caucuses were established, a Federal Agency Network was launched, five State agencies were added to the State Agency Steering Committee, and a new Tribal Advisory Committee was formed.
- Data, metrics, and analysis:
 - **Sustainability indicators** An analysis framework was developed to identify, compute, and evaluate sustainability indicators that would help monitor progress toward reaching the goals and objectives of Update 2013.
 - Improved data, metrics, and analysis methodologies Data and methods for quantifying alternative scenarios of future water demand and supply conditions were improved and were used to evaluate the performance of potential water management responses for Update 2013.
- Adaptive management:
 - **Update 2013** *Progress Report* A new, mid-process progress report was added, to assess progress on Update 2009 recommendations and suggest areas of focus for Update 2013.
 - Climate change Greater detail and more regionally specific climate change information was provided for Update 2013 than was provided within Update 2009. This included regionally appropriate and statewide adaptation and mitigation strategies, RMSs, and climate change scenario decision support.

Progress Toward Implementing Update 2009 Objectives

- Update 2009 included an "Implementation Plan" chapter with objectives and related near- and long-term actions. By statute, the CWP has no powers to mandate that its recommendations be funded or implemented. The plan must be furthered by agencies or voting bodies that can implement its tools, plans, and actions. IWM entities at the local, State, and federal level have initiated and completed many of these actions, and they continue to make progress on other actions. Generally speaking, notable progress includes better interagency communication and collaboration, improved understangency of climate change, and new analytical approaches and tools to help manage resources into the future.
- Progress toward implementing Update 2009 is detailed in the Update 2013 Progress Report (Progress
- 43 Report). The Progress Report assessed whether and to what extent the 13 objectives (and 115 related
- 44 actions) of Update 2009 have been implemented. It also identified key implementation impediments, as
- 45 well as better ways to articulate more measurable objectives for Update 2013. This information can be

used to direct the attention and resources of decision-makers, planners, and stakeholders to actions that are not progressing. The Progress Report also helped make the Update 2013 "Roadmap For Action" chapter (Chapter 8 of this volume) more implementable and measureable (for reporting in *Update 2018* Progress Report). Table 1-1 is a summary of progress on the implementation of Update 2009 objectives and actions from the Progress Report.

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PLACEHOLDER Table 1-1 Progress Report on Implementation of Update 2009

Any draft tables, figures, and boxes that accompany this text for the public review draft are included at the end of the chapter.]

In addition to progress made specifically toward implementing the Update 2009 objectives and related actions, many related significant accomplishments have been made or are ongoing since 2009. For example, the 2009 water legislation package (described further in Chapter 3 of this volume, "California Water Today") represents major steps toward ensuring a reliable water supply for future generations, as well as restoring the Delta and other ecologically sensitive areas. There has been significant progress in implementing this legislation. Regional entities and water communities have continued to advance IRWN through the development of 48 regional planning entities and the allocation of more than \$10 billion in general obligation bonds since 2009. State agencies have continued to seek alignment of data, plans, policies, and regulation. Almost universally across all programs, data and technology have greatly improved Californians' ability to better manage water resources and plan for future improvements. More complete descriptions of implementation progress can be found in the Progress Report; in Chapter 3, "California Water Today"; in Chapter 4, "Strengthening Government Alignment"; and in Volume 4, Reference Guide.

Table 1-1 Progress Report on Implementation of Update 2009

Update 2009 objective	Status	Trend
Expand Integrated Regional Water Management	Good	Neutral
2. Use and Reuse Water More Efficiently	Requires attention	Good
3. Expand Conjunctive Management of Multiple Supplies	Requires attention	Good
4. Protect Surface Water and Groundwater Quality	Requires attention	Good
5. Expand Environmental Stewardship	Requires attention	Neutral
6. Practice Integrated Flood Management	Good	Good
7. Manage a Sustainable California Delta	Good	Good
8. Prepare Prevention, Response, and Recovery Plans	Neutral	Requires attention
9. Reduce Energy Consumption of Water Systems and Uses	Neutral	Neutral
10. Improve Data and Analysis for Decision-making	Good	Good
11. Invest in New Water Technology	Good	Good
12. Improve Tribal Water and Natural Resources	Neutral	Requires attention
13. Ensure Equitable Distribution of Benefits	Unavailable	Unavailable

Figure 1-1 Themes of 2013 California Water Plan

Integrated water management **Integrated Water Management** System flexibility and resiliency provides a set of principles Advocacy from implementers and financiers Delivery of benefits using fewer resources and practices that include **Government Agency Alignment** government agency alignment Clarification of state roles through open and transparent Reduction in implementation time and costs Efficient achievement of multiple objectives planning process. This leads to Investment in Innovation and Infrastructure stakeholder and decision-maker Stable and strategic funding Priority-driven funding decisions support for investment ... Equitable and innovative finance strategies in innovation and infrastructure.

Figure 1-2 Foundational Components of the 2013 California Water Plan



1 **Box 1-1 State Integrated Water Management Investment Categories** 2 Innovation: 3 • Governance of State integrated water management (IWM) improvements. 4

• Strengthening government agency alignment.

• Planning and public engagement improvements.

- Information technology (data and analytical tools) improvements.
 - Water technology and science advancements.
- Research, development, and implementation incentives.

9 Infrastructure (human and ecosystem), implemented at the following scales:

10 · Local.

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- 11 • Groundwater basin.
- 12 · Watershed.
- 13 • Regional.
- 14 • Interregional.
- 15 State.
- 16 • Interstate.
- 17 • International.
- 18 • Tribal.

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Chapter 2. Imperative to Invest in Innovation and Infrastructure

About This Chapter

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- 5 This chapter describes the urgency behind continuing to invest in integrated water management (IWM) in 6 California. Strategic investments in both innovation and infrastructure (surface water and groundwater 7 facilities and ecosystems) will provide for future public safety enhancements, environmental stewardship, 8 and economic stability. This course of action will help avert several foreseeable societal catastrophes, 9 such as loss of life and property from floods, unreliable water supplies, and adverse impacts of droughts;
- 11 **PUBLIC SAFETY ECONOMIC STABILITY** ENVIRONMENTAL STEWARDSHIP
- 12 The primary purpose of this chapter is to guide strategic, disciplined investment and remove

depletion of groundwater basins; irreversible land subsidence; and declining ecosystems.

- 13 implementation impediments by working to achieve the California Water Plan's (CWP's) vision, mission,
- 14 goals, and objectives, which are described herein. The roadmap in this chapter (in conjunction with more
- 15 specific actions in Chapter 8, "Roadmap For Action") will help reduce uncertainty and improve the
- 16 reliability of the California's watersheds and water systems for all uses. In turn, California's business
- 17 climate and quality of life will be improved. An open and transparent planning process will lead to
- 18 stakeholder and decision-maker support for investment in various areas of resource management.
- 19 This chapter describes the following: 20
 - A Critical Time to Invest.
 - Fundamental Lessons.
 - Focus of Update 2013 Three Overarching Themes.
 - Role of State Government in Integrated Water Management.
 - Looking to the Future

A Critical Time to Invest

- 26 Water planners, managers, and stakeholders throughout California agree that our state is facing a
- 27 convergence of unprecedented challenges. Such challenges range from social (e.g., complicated
- 28 governance, divergent priorities among stakeholders, unwillingness or inability to pay for public 29
- infrastructure or services) to geophysical (e.g., climate change, limitations of natural resources, 30 limitations of existing physical infrastructure). State, federal, and local agencies need to step up efforts to
- 31 enhance California's business and finance climate by increasing the certainty that flood damages will be
- 32 averted, surface water and groundwater supplies will be reliable and predictable, and recreational
- 33 opportunities and environmental sustainability will be improved.

1 Resolving these challenges is becoming more difficult as time passes. While many of the most cost-2 effective system infrastructure improvements have already been constructed, past implementation did not 3 always adequately account for costs of ecosystem or other improvements that society values today. As a 4 result, future system improvements are going to cost more. Adequate funding will be further complicated 5 by the lingering effects of the financial crisis that State, federal, and local agencies have faced in recent 6 vears.

California still faces many of the conditions that were highlighted in California Water Plan Update 2009 (Update 2009). While the drought that the State faced in 2009 has passed, January and February 2013 (when much of the snowpack should accumulate) were observed as the driest January and February since 1921, raising the question of whether California is entering another critical drought. [replace with whatever is appropriate at time of printing In many cases, the effects of the challenges described below can combine to create problems larger than their sum. Over the longer term, climate change will continue to reduce our snowpack storage, increase sea level, and degrade water quality in the estuarical all of which reduce water supply reliability and increase flood risk. In addition, the timing, magnitude, and duration of snowmelt runoff in some areas may reduce seasonal recharge and long-term aquifer storage. Court decisions and regulations have resulted in the reduction of water deliveries from the Sacramento-San Joaquin Delta (Delta) by about 20 to 30 percent. Key fish species continue to decline. In some areas of the state, our ecosystems and quality of underground and surface waters are unhealthy.

California needs to step up and sustain investment in innovation and infrastructure (constructed and ecosystem) as described in California Water Plan Update 2013 (Update 2013) (see Chapter 7, "Finance Planning Framework") or live with an unacceptable reduction in public safety, quality of life, and environmental stewardship for generations to come. The challenges identified in Chapter 3, "California Water Today," though often interrelated, can be viewed as independent issues facing water management. Combinations of these challenges can be summarized as the critical conditions discussed below, the potential consequences of which make this a critical time to invest. For example, population, land use, and geophysical variability, as well as other factors that can pose challenges, have an impact on how droughts affect each region.

Greater Drought Impacts

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Droughts cause economic harm to urban and rural communities and loss of crops, heighten the potential for species collapse and extreme fire danger, degrade water quality, and increase stresses on groundwater aquifers. Even a single dry year can negatively affect activities that are wholly dependent on unmanaged water supplies, such as dryland farming, livestock grazing, and many recreational water uses. Multiple consecutive dry years have and will continue to occur, a condition that exponentially increases impacts of reductions in available surface and groundwater supplies. Vulnerabilities to drought are increasing due to the several factors, including population growth, increases in permanent crops, aging or limited water distribution infrastructure, previous implementation of the most cost-effective or implementable resource management strategies (e.g., water users who have already increased efficiency may find it more challenging to achieve additional water use reductions during droughts), more volatile and unpredictable climate patterns, and ecosystems that are already struggling as a result of other factors. During dry years, water management becomes more complex when various water users may seek to use the same diminished water supply. (See Figure 2-1, "Historical Droughts in California.")

1 **PLACEHOLDER Figure 2-1 Historical Droughts in California** 2 [Any draft tables, figures, and boxes that accompany this text for the public review draft are included at 3 the end of the chapter.] 4 Increasing Flood Risk 5 California has nearly \$600 billion of assets and over 7 million people at risk of flooding (see Figure 2-2). 6 Every Californian, however, is exposed to the significant impacts that result from flooding, including 7 disruption of commerce, response and the secondary economic impacts that ripple through the state's 8 economy (e.g., redirection of funding from other State government services). In effect, all California 9 taxpayers participate in recovery from floods. People continue to move into floodplains and flood-prone 10 areas throughout the state. Sacramento, California's capital, has one of the lowest levels of flood 11 protection of any major city in the nation. Under certain circumstances, some urbanized communities in 12 the region could be flooded by more than 20 feet of water. The threat of catastrophic flooding, especially 13 in the deep floodplains of the Central Valley and the Delta, is a continuing concern, especially with regard 14 to public safety. If not proactively managed in the future, economic, environmental, and social impacts 15 from recent catastrophes, such as flooding from hurricanes Katrina and Sandy, will continue to occur. 16 **PLACEHOLDER Figure 2-2 Types of Flooding in California** 17 [Any draft tables, figures, and boxes that accompany this text for the public review draft are included at 18 the end of the chapter.] 19 **Depleting Groundwater Basins** 20 California's groundwater supplies and aquifer storage capacities play a very significant role in IWM. 21 Reliance on groundwater will continue to increase as the population grows, as limitations on available 22 surface water continue, and as potential impacts of climate change occur. Groundwater provides about 23 40-50 percent of total annual agricultural and urban water uses. Some cities, coastal basins, and rural 24 areas are 100-percent dependent on groundwater for their water supply. A number of groundwater basins 25 in California have experienced alarming declines in groundwater levels, degradation in water quality, 26 irreversible land subsidence, decreases in base-flow contribution to surface water systems, and subsequent 27 loss of vital ecosystem services. 28 The Central Valley aquifer of California is the second most pumped aquifer in the U.S. and contributes 7 29 percent of the total U.S. food supply (\$21 billion annually) and contains one-sixth of the nation's irrigated 30 land. Groundwater storage depletion in the Central Valley aquifer from 2005 to 2010 ranges between 5.5 31 and 13.0 million acre-feet. Declines in groundwater levels in Tulare Lake hydrologic region have reached 32 25 feet for the same period (refer to Figure 2-3). (See Chapter 3, "California Water Today," for more 33 detailed information on groundwater conditions.) Update 2013 advanced and applied a method for 34 calculating the change in the amount of water stored in the aquifer. The purpose of applying this method 35 is to better inform the actions needed to help align statewide policy, focus limited financial resources, and 36 ultimately improve groundwater and surface water management practices. Linking the local management 37 of the two inseparable resources of groundwater and surface water, within the context of a broader IWM 38 plan, will be an important step toward the goal of creating a sustainable and resilient water portfolio for 39 the future. (See Chapter 6, "Integrated Data and Analysis," for more information.)

1 PLACEHOLDER Figure 2-3 Change in Groundwater Storage in the Central Valley Aquifer of 2 California (2005-2010) 3 [Any draft tables, figures, and boxes that accompany this text for the public review draft are included at 4 the end of the chapter.] 5 **Declining Ecosystems** 6 California has lost more than 90 percent of the wetlands and riparian forests that existed before the Gold 7 Rush. Successful restoration of aquatic, riparian, and floodplain species and communities ordinarily 8 depends on at least partial restoration of physical processes that are driven by water. The diminution of 9 these physical processes often leads to displacement of native species, presenting another huge barrier to 10 ecosystem restoration. The ecosystems in many areas of the state have declined; many species have been 11 listed as threatened or endangered. Watershed health, including lack of suitable habitat, competition with 12 invasive species, pollution, and water management activities contribute to the decline. One of the most 13 obvious examples of an ecosystem in crisis is the Delta. Salmon, delta smelt, and other species are at their 14 lowest levels since records were first kept about 50 years ago. This decline has led to court restrictions 15 and new regulations on Delta diversions. (Refer to Figure 2-4, "Sensitive Species in California.") 16 **PLACEHOLDER Figure 2-4 Sensitive Species in California** 17 [Any draft tables, figures, and boxes that accompany this text for the public review draft are included at 18 the end of the chapter.] 19 Degraded Surface and Groundwater Quality 20 The quality of groundwater and surface waters varies significantly throughout the state. Degradation is 21 occurring naturally and as a result of human activities. Improvements must be made in drinking water 22 treatment, cleanup of polluted groundwater, salt management, and urban runoff management. High 23 priority must be given to creating healthy watersheds to keep source water free of pollutants, such as 24 pathogens and chemicals that are regulated or will be regulated in the near future. Recently, some 25 unregulated chemicals and pollutants have emerged as actual or potential contaminants. They can occur in 26 pharmaceuticals and personal care products, byproducts of fires and fire suppression chemicals and 27 agents, or discarded elements of technology. 28 Aging Infrastructure 29 Conditions today are much different than when most of California's water system was constructed, and 30 upgrades have not kept pace with changing conditions, especially considering the growing population; 31 changing societal values, regulations, and operational criteria; and the future challenges accompanying 32 climate change. California's water supply and flood protection systems, composed of aging infrastructure 33 (with major design and construction deficiencies, has been further weakened by insufficient maintenance 34 in some areas. State and regional budget shortfalls and a tightened credit market may delay new projects 35 and programs. 36 **Changing Water Demands** 37 California's changing and potentially competing demands for water come from many sectors. All uses 38 generally can be characterized as urban, agricultural, or environmental. The state's population continues

- to grow and the trend has been faster growth in warmer inland regions. From 1990 to 2010, California's
- 2 population increased from about 30 million to about 37.3 million. The California Department of Finance
- projects that this trend means a state population of roughly 51 million by 2050. Chapter 5, "Managing an
- Uncertain Future," presents scenarios of future changes in water demand through 2050 that consider
- uncertainties surrounding future population growth, land use decisions, and climate change.

Physical Variability and Social Diversity

- 7 The above critical conditions become more difficult in the face of physical variability and social diversity.
- 8 California is often recognized as a land of extremes for its diversity of cultures, ecosystems, geography,
- and water resources. Precipitation, which is a primary source of California's water supplies, varies from
- place to place, season to season, and year to year. Most of the state's snow and rain fall in the northern
- mountains and eastern regions, and the most water is used in the valleys and along the coast. Moreover,
- the state's ecosystem, agricultural, and urban water users have variable needs for the quantity, quality,
- timing, and place of use. The water and flood systems face the dual threats of too little water to meet
- needs during droughts and too much water during floods. The physical and social realities within
- California do not allow for a one-size-fits-all approach to water management and planning. California's
- State, federal, tribal, regional, and local projects and programs must work together to make water
- available in the right places and times and to safely move floodwaters.
- California's various cultures, organizations, and individuals naturally assign different values and priorities
- to these IWM-related assets, services and benefits. They also naturally have different reliance on, or rates
- of consumption of, IWM-related resources. Disparate priorities, practices, and resource consumption rates
- define California's rich social diversity. To further complicate planning, various regions of the state
- experience differences in natural hydrology, ecosystem condition, water supply and use, flood risk, and
- opportunities and needs for system improvements. Therefore, while investments for statewide water
- management must be made, the focus of planning needs to be on a regional basis.
- See Chapter 3, "California Water Today," for a more complete description of variability and diversity
- throughout California.

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27 Climate Change

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- The above conditions become more difficult and uncertain given potential future climate change. Water
- sector vulnerability to climate change stems from changes in hydrology that affect frequency, magnitude,
- and duration of extreme events, including flooding and drought. In turn, these affect water quantity,
- quality, and infrastructure. Reduction in snowpack storage affects water supply reliability, hydropower,
- and the amount of runoff during extreme precipitation that leads to flooding. Rising sea levels increase
- susceptibility to coastal flooding. These climate change conditions also affect Delta levee integrity and
- water quality. Changes in Delta water quality and the need to meet water quality requirements may
- require changes in upstream water management and resultant changes in local water supply reliability and
- water quality. Recreation and tourism are also likely to suffer due to lower water levels in waterways and
- reservoirs and declining snowpack. (Refer to Figure 2-5, "Climate Change Effects in California.")

38 PLACEHOLDER Figure 2-5 Climate Change Effects in California

[Any draft tables, figures, and boxes that accompany this text for the public review draft are included at the end of the chapter.]

1 Specific consequences of climate change are that higher temperatures will melt the Sierra snowpack 2 earlier and drive the snowline higher, resulting in less snowpack to supply water to California users. 3 Rainfall events may become more frequent and intense, contributing to increased flood risk. Droughts 4 may become more frequent and persistent this century. Accelerating sea level rise will produce higher 5 storm surges during coastal storms. Together, higher winter runoff and sea level rise will increase the 6 probability of levee failures in the Delta. Sea level rise will also place additional constraints on water 7 management and exports from the Delta, especially due to increased salinity from tidal exchange in the 8 Delta. By the end of the 21st century, the magnitudes of the largest floods may increase from 110 to 150 9 percent of historical magnitudes (Das et al. 2011; Pierce et al. 2012).

Future Uncertainty

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- California must invest in IWM activities in the face of many uncertainties. There are enormous uncertainties facing water managers in planning for the future. How water demands will change in the future; how ecosystem health will respond to human use of water resources; what disasters may disrupt the water system; and how climate change may affect water availability, water use, water quality, and the ecosystem are just a few uncertainties that must be considered. The goal is to anticipate and reduce future uncertainties, and to develop water management strategies that will perform well despite uncertainty about the future. Uncertainties will never be eliminated, but better data collection and management and improved analytical tools will allow water and resource managers to better understand risks within the system. Chapter 5, "Managing an Uncertain Future," provides more detail on risk and uncertainty in California water resources management.
- The CWP acknowledges that planning for the future is uncertain and change will continue to occur. It is not possible to know for certain how population growth, land use decisions, water demand patterns, environmental conditions, the climate, and many other factors that affect water use and supply may change by 2050. To anticipate change, the approach to water management and planning for the future needs to consider and quantify uncertainty, risk, and sustainability. Californians must fundamentally change how water is used and managed and account for future uncertainty. IWM that employs a diversified portfolio of management actions, along with seeking flexibility in water management, is important for managing this uncertainty.

Consequences of Foregone Investment

The opportunity provided by IWM includes a future in which water demands are met, the quality of surface-water and groundwater sources and supplies are improved, system flexibility and resiliency are improved to deal with droughts and floods, and ecosystems are restored and enhanced to sustain our natural resources. Insufficient investment in IWM, on the other hand, would bring severe threats to public safety, environmental stewardship, and economic stability. Just as a car needs to be regularly maintained and rehabilitated to avoid risking a costly breakdown, IWM requires continuous investment even to sustain current levels of performance and avoid a costly and less prosperous future that puts businesses and investments at risk, destroys cherished ecosystems, and makes communities less safe and less desirable. Much of the state's vital water infrastructure was the result of investments made by previous generations. California cannot afford to sacrifice the future by failing to invest in water today. Volume 4, "Reference Guide," provides more information on the cost of forgone investment.

Fundamental Lessons

The Update 2013 strategic plan sets an urgent course for action that is informed by fundamental lessons learned by California's water community through the experience of recent years. Update 2013 embodies these fundamental lessons:

- Sustainable development and water use, as well as environmental stewardship, foster a strong economy, protect public health and the environment, and enhance quality of life. Managing for sustainability relies on the full consideration of social, economic, and environmental values in all phases of planning and policy- and decision-making. Sustainable water use ensures development and management of surface water and groundwater and related resources in a way that meets present needs while protecting and enhancing watersheds and the environment, and assures the ability to meet the needs of the future.
- IWM on regional and statewide scales is the basis of planning for California's water future with actions that provide multiple benefits. Reducing uncertainties and assessing risks to the surface water and groundwater supply and flood systems are essential for developing plans that also allow for sustainability of water uses, systems, and resources.
- A diversified portfolio of resource management strategies improves system flexibility and resiliency for changing and extreme hydrologic conditions.
- Solutions to California's water and flood management challenges are best planned and carried
 out on a regional basis. Hydrologic, demographic, geopolitical, socioeconomic, and other
 differences among California's regions demand that the mix of water management strategies be
 suited to meet each region's needs for the long term.
- Water conservation, recycling, and greater system efficiency in California must continue to be a fundamental strategy for all regions and individual water users in California. The cumulative effect of each decision to use water more efficiently has an enormous impact on future water supplies and water quality.
- California can better prepare for future droughts and climate change, as well as improve water supply reliability and water quality, by taking advantage of the extensive water storage capacity of groundwater basins when managed in closer coordination with surface storage and other water supply sources, when available. These supplies include, but are not limited to, recycled municipal water, surface runoff and flood flows, urban runoff and stormwater, imported water, water transfers, and desalination of brackish and sea water.
- California must protect the quality of its surface water and groundwater and use available supplies with greater care because water will always be a precious resource.
- California needs additional groundwater and surface water storage capacity. Storage gives
 water managers tremendous flexibility to invest in a greater number of resource management
 strategies, meet multiple needs, and provide vital reserves in drier years. In many cases, storage
 is necessary for benefits from other resource management strategies to occur, such as waterdependent recreation, conjunctive management, conveyance, and environmental stewardship.
- When technically, legally, and environmentally feasible, available aquifer space should be used for managed recharge for implementing multi-benefit projects that generate source water for groundwater storage by capturing water not used by other water users or the environment.
- California must develop and implement aquifer recharge area delineation and mapping required by Assembly Bill (AB) 359 and promote groundwater planning transparency and public education.

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- Management to sustain the Delta will require that a healthy Delta ecosystem and a reliable water supply for California be coequal goals, and that we recognize the Delta as a unique and valued area.
- State government has a lead role in coordinating the water management activities of federal, tribal, regional, and local governments and agencies and developing stable strategies for financing water management actions.
- Science and technology are providing new insights into threats to our watersheds including our waterways and groundwater basins — from climate change and other stressors. California must use this knowledge to take protective actions and manage water in ways that protect and restore the environment.
- California must strengthen and expand the California Statewide Groundwater Elevation Monitoring (CASGEM) Program for its long-term sustainability, complete groundwater management and planning assessments for all Senate Bill (SB) 1938 groundwater management plans and develop guidelines to promote best practices in groundwater management, and undertake statewide groundwater basin assessment for the CASGEM high-priority basins.

Focus of Update 2013 — Three Overarching Themes

The complete Update 2013 (all volumes) contains a large variety of information, as outlined in Chapter 1 and in the guide "Navigating Update 2013," within this volume. This information serves many purposes among a wide variety of audiences, such as elected officials, planners, tribal entities, academia, the general public, and others. While Update 2013 contains many refinements from Update 2009, Update 2013 has significantly advanced the State's strategic plan in three critical areas. To address challenges and build upon past successes, the California Water Plan Update 2013 recommends additional strategies and actions to:

- Enhance regional and statewide IWM.
- Strengthen government agency alignment.
- Invest in innovation and infrastructure.

27 These three themes, which emerged during the development of Update 2013, provide focus for refining 28 and advancing the strategic plan and are applicable to every level of resource planning. These themes are 29 interconnected and never considered separately. The strategic plan embraces the themes (described 30 below) as the basis for developing tools, plans, actions, and achieving results portrayed in *California* 31 Water Plan Update 2013. These three themes, in addition to the Update 2013 vision, mission, goals, 32 guided the development of the objectives and related actions, all of which are described in Chapter 8, 33

"Roadmap For Action."

Enhancing Regional and Statewide Integrated Water Management

35 The first theme for Update 2013 is to improve IWM and covers both regional and statewide scales. With 36 Update 2013, the State is renewing its commitment to IWM. IWM is a strategic approach to planning and

37 implementing water management programs that combines flood management, environmental stewardship, 38

and water supply actions to deliver multiple economic, environmental, and social benefits across

39 watershed and jurisdictional boundaries. The strategic plan included in Update 2013 builds on the

40 foundation for IWM presented in Update 2009.

1 IWM provides a set of principles and practices that include strengthening government agency alignment 2 through open and transparent planning process. This leads to stakeholder and decision-maker support for 3 investment in various aspects of resource management, such as innovation and infrastructure. This 4 support provides increased advocacy, as well as a greater number and variety of potential implementers 5 and financiers. 6 PLACEHOLDER Box 2-1 Integrated Water Management — What and Why 7 [Any draft tables, figures, and boxes that accompany this text for the public review draft are included at 8 the end of the chapter.] 9 IWM and integrated regional water management (IRWM) practices have made strides over the past 12 10 years, and Update 2013 encourages the expansion and enhancement of these practices. 11 The following key concepts enhance successful IWM planning: 12 **Broad-based Knowledge** — The IWM approach relies on blending knowledge from a variety 13 of disciplines, including engineering, economics, environmental sciences, public policy, and 14 public information. It includes information gathering and other tools, policies, planning, 15 regulations, and investments. Technical analyses simultaneously consider flood management, 16 water supply, water quality, land use, water supply, ecosystem, and other actions to deliver 17 multiple benefits at watershed and basin scales. This approach also promotes system flexibility 18 and resiliency to accommodate changing conditions, such as regional preferences, ecosystem 19 needs, climate change, flood or drought events, and financing capabilities. 20 **High Value, Multiple Benefits** — IWM recognizes that localized, narrowly focused project 21 are not the most cost-effective use of public and ratepayer resources and often have negative 22 unintended consequences within regions. The IWM approach helps deliver more benefits at a 23 faster pace, while using fewer resources, than is possible with single-benefit projects. 24 **Broad Access to Funding Sources** — One of the benefits of using an IWM approach is the 25 potential to access funding sources that may not have been available to single-benefit projects. 26 This is particularly important to achieving sufficient and stable funding for long-term flood 27 management. 28 Collaboration and Alignment Are Necessary — Efforts to effectively manage California 29 natural resources will require unprecedented alignment and cooperation among public agencies, 30 tribal entities, landowners, interest-based groups, and other stakeholders. Collaboration is 31 required to prioritize actions and garner enough community support for investment to occur and 32 be sustained. Better agency alignment of plans, policies, and regulations is needed to improve 33 and expedite implementation.

34 The objectives and the related actions described in Chapter 8, "Roadmap For Action," collectively are the 35 proposed improvements in IWM.

36 Update 2013 represents an important next step in advancing IWM by articulating the outcomes or types of 37 benefits of greatest value to stakeholders. These desired outcomes define the scope of IWM. See Box 2-38

for a list of desired outcomes as expressed by stakeholders. This list also represents the scope of IWM. 39

For example, actions that produce one or more of the desired outcomes fall within the scope of IWM.

1 PLACEHOLDER Box 2-2 IWM Desired Outcomes

[Any draft tables, figures, and boxes that accompany this text for the public review draft are included at the end of the chapter.]

Strengthening Government Alignment

The second theme for Update 2013 is strengthening government agency alignment. Update 2013 includes actions to make significant improvements in agency alignment from that presented in Update 2009. The primary purpose for improving alignment of government agencies is to expedite implementation of resource management strategies and help assure efficient achievement of multiple objectives. This includes collaboration with regulatory agencies to reduce time and costs required to implement IWM projects while protecting and enhancing natural resources.

Labyrinth of Laws

Currently, project implementers must navigate and comply with California's labyrinth of uncoordinated and at times conflicting laws and regulations that lead to project delays and mounting planning and compliance costs. These ultimately create significant difficulties in meeting basic community safety and water supply needs, along with goals outlined in Update 2013. For example, implementation of Stategovernment-incentivized groundwater recharge projects have been delayed or abandoned owing to a State permitting process that places risks on the implementer's water rights (i.e., regulations require surfacewater-right holders to reopen historic water-rights agreements, subjecting water rights holders to the risk of various unrelated water rights challenges, so as to include groundwater recharge as a approved beneficial use of the original surface-water right). This is even true for small projects that are well planned, have the voluntary support of private landowners, and would provide multiple benefits. In fact, project participants (e.g., landowners and financiers) that have gone through the permitting process are often not willing to tackle the process again. Those who have heard second hand about the process tend to opt out when presented with opportunities to contribute. Addressing this challenge represents a critical scope of work. It is important to acknowledge that regulations can and do also provide basic community safety and water supply needs. They also help meet many CWP goals. Update 2013 promotes innovation for all IWM tools, including all regulation and administrative tools.

Social and Technical Complexities

At the same time, planning a project within the current regulatory environment is technically complex, making it difficult for a single entity to comprehend all the geophysical and social complexities and dynamics of resource management and planning. California also has a wide variety of climates, landforms, institutions, as well as a very diverse, place-based range of cultures that constitute what might best be described as anthrodiversity (e.g., the human aspect of biodiversity that denotes the value of and public interest in sustaining varied human habitats, such as rural, suburban, and urban communities). This means that in a state as large and diverse as California, data management, planning, policymaking, and regulation must occur in a very collaborative, regionally based manner, with the ultimate product being a composite of input and data from a large variety of elected officials, opinion leaders, stakeholders, scientists, and subject experts. Sound outcomes rely on a blend of subject expertise and perspectives woven together (e.g., hydrology, climatology, engineering, earth sciences) into comprehensive policies and implementation decisions that are place-based and regionally appropriate.

Collaborating For Alignment 2 The California Biodiversity Council has created an initiative to improve the alignment of relevant plans, 3 programs, policies, and regulations (see Box 2-3). Update 2013 leverages, expands (to the full scope of 4 IWM), and evolves this work. Chapter 4, "Strengthening Government Alignment," elaborates on existing 5 water management governance and the move toward improved government alignment. 6 PLACEHOLDER Box 2-3 California Biodiversity Council 7 [Any draft tables, figures, and boxes that accompany this text for the public review draft are included at 8 the end of the chapter.] 9 Strides have been made to improve alignment, such as the formation and engagement of the Water Plan 10 State Agency Steering Committee, Water Plan Federal Agency Network (FAN), and 48 regional water 11 management groups. However, local, State, federal, and tribal governments often do not collaborate to the 12 degree necessary to effectively manage the challenges described above. Examples of impacts from 13 insufficient government alignment include the fact that planning and permitting costs of projects 14 frequently exceed the implementation and acquisition costs for many infrastructure and ecosystem 15 enhancement activities. In many other cases, program or project implementation has yet to occur despite 16 decades of planning activities, even as the intended benefits of these programs and projects are forgone as 17 a result of the delays. The Update 2013 outreach and engagement process is described in Volume 4, 18 Reference Guide, in the article, "Process Guide — California Water Plan Update 2013." Figure 2-6 19 illustrates the breadth of participants that contributed to Update 2013. 20 PLACEHOLDER Figure 2-6 Water Plan Update 2013 Collaboration Graphic 21 [Any draft tables, figures, and boxes that accompany this text for the public review draft are included at 22 the end of the chapter.] 23 Update 2013 has taken a first step in aligning State government by incorporating information and 24 recommendations from IWM-related planning documents of the State Agency Steering Committee 25 member agencies. Featured State plans and initiatives are those plans and programs by State, federal, 26 tribal, and local government agencies that have a direct connection with the CWP. Chapter 4, 27 "Strengthening Government Alignment," in this volume describes plans used to develop and augment the 28 content in the Update 2013. 29 Investing in Innovation and Infrastructure 30 The third theme for Update 2013 is to improve investment in innovation and infrastructure. A stable, 31 effective funding stream is an essential component of successful water resource implementation. 32 California Water Plan Update 2013 provides strategies for future funding, a major improvement over 33 Update 2009. 34 California has nearly \$600 billion of assets and over 7 million people at risk of flooding. There are also 35 over 10,000 projects identified within the 48 integrated regional water management plans. In total, 36 resource management actions will require up to \$500 billion of future investment over the next few 37 decades to reduce flood risk, provide reliable and clean water supplies, and enhance ecosystems and their 38 services. We are beginning to integrate resource management and planning, but funding remains 39 fragmented, unstable, and inefficient, which limits opportunities for further integration.

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1 **PLACEHOLDER Box 2-4 Failure to Act** 2 [Any draft tables, figures, and boxes that accompany this text for the public review draft are included at 3 the end of the chapter.] 4 Other compounding challenges include the fact that debt is at near-record levels, existing bond funds will 5 be fully allocated by 2017, willingness of the public to pay for government activities is waning, 6 investment in infrastructure and ecosystem values and services has been deferred for decades, and future 7 federal funding is highly uncertain. This debt level increases pressure on developing alternative financing 8 strategies that capitalize on local, State, and federal cost sharing and integrated management. 9 Very little of the total state IWM funding allows discretion or flexibility. Bond and legislative language 10 designates funding purposes. General obligation bonds backed by property taxes and the General Fund 11 are required to be used for capital projects, not operation and maintenance. Revenue and lease-revenue 12 bonds, typically used by local agencies, offer more flexibility. In general, the discrete nature of bond 13 money makes this financing source better suited for one-time investments. 14 From 1995 to 2010, average annual State expenditures were about \$2 billion per year, with a peak of just 15 over \$2.5 billion in fiscal year (FY) 2010. This is largely attributable to bond money from continued 16 appropriations of Propositions 1E and 84. For that same time frame, federal expenditures averaged \$1.2 17 billion per year, with a peak of \$1.4 billion in FY 2001 and again in FY 2005. Local expenditures 18 comprise the largest component, averaging \$14.5 billion per year. Local expenditures peaked at about \$18 19 billion in FY 2010. This is likely a result of increased subventions and loans from DWR related to 20 Propositions 1E and 84. While overall IWM expenditures in California have been increasing in recent 21 years, federal investment is shrinking relative to State and local investment. 22 Through intensive collaboration with the Update 2013 Finance Caucus, the investment categories 23 presented below in Box 2-5 helped support a common understanding of potential investments and an 24 effective role for State government. This approach was useful for aligning funding and finance planning 25 processes across over 2,300 local, State, and federal government agencies, each with its own planning 26 processes and scales. 27 PLACEHOLDER Box 2-5 Categories of Integrated Water Management Investment 28 [Any draft tables, figures, and boxes that accompany this text for the public review draft are included at 29 the end of the chapter.] 30 Update 2013 provides a more comprehensive approach to State IWM funding and finance compared with 31 historical and current practices of prioritizing activities and projects by a combination of funding 32 earmarks and a project's readiness for construction. 33 Chapter 3, "California Water Today," describes existing local, State, and federal IWM spending and debt 34 levels. Currently, projects that tend to be most implementable, most consistent with priorities of a 35 particular funding source, or that happen to be at the front of the queue when money becomes available, 36 are often not linked to multi-faceted strategic objectives. The approach used for Update 2013 promotes 37 proactive planning and prioritization of activities to drive future investment decisions and funding. See 38 Chapter 7, "Finance Planning Framework," for a description of finance categories and strategies, 39 including general obligation bonds, fees, taxes, and public-private partnerships.

- 1 Two primary categories of investment are innovation and infrastructure. Infrastructure includes structures
- and facilities that support human activities, but it also includes green infrastructure (e.g., wetlands,
- ³ riparian habitat, watershed systems). Innovation includes development of new analytical tools and other
- 4 planning process improvements. Both categories may include the capital cost of constructing a facility or
- 5 restoring habitat and the long-term operation and maintenance costs, which have often been an
- afterthought to implementation and not adequately financed over their useful life.
- 7 Innovation and infrastructure are further broken down into investment categories (again, for State
- 8 government policymaking purposes), as shown in Box 2-5. In addition to the categories of investment
- shown in Box 2-5, there are many resource management and administrative tools included in Update
- 10 2013.

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- There are 30 resource management strategies presented in Volume 3, which are grouped according to these seven categories:
 - Reduce water demand.
 - Improve operational efficiency & transfers.
- Increase water supply.
 - Improve flood management.
 - Improve water quality.
 - Practice resource stewardship.
- People and water.
- Similarly to the resource management strategies described in Volume 3 of Update 2013, which focus on
- actions, there are also several administrative tools that can be used to generate IWM benefits. See
- Chapter 7, "Finance Planning Framework," for more information on administrative tools. There are seven categories of administrative tools:
- Collaborative decision-making.
 - Education.
 - Legislation.
 - Voter-approved propositions.
 - Regulation.
- Permitting.
- Litigation.

The Update 2013 approach to guiding future investment improves the apportioning and better informs the use of different financial strategies. The Investment in Innovation and Infrastructure theme has a major role in advancing Update 2013 from Update 2009. In weaving the theme throughout this Update 2013 strategic plan, the following related needs played a major role in the preparation of Chapter 7, "Finance Planning Framework," and the financing actions in Chapter 8, "Roadmap For Action." Development of

- Planning Framework," and the financing actions in Chapter 8, "Roadmap For Action." Development the finance strategy for Update 2013 considered ways to:
 - Increase the reliability, predictability and level of State IWM funding for statewide and regional water programs and projects.
 - Provide a consistent method for allocating, awarding, and disbursing State funding for water innovation and infrastructure programs and projects.
 - Use competitive incentive programs in favor of funding earmark

- Include regional accounts to continue IRWM to increase flexibility, reflect local and regional conditions, and advance regional goals and investment priorities.
 Provide presentive planning and implement consistent rules and standards for allocating States.
 - Provide proactive planning and implement consistent rules and standards for allocating State funding.

Role of State Government in Integrated Water Management

- The guidance provided by the Update 2013 vision, mission, goals, objectives, and principles (see Chapter
- 7 8) are applicable to all levels of planning and by federal, State, and local agencies and other implementing
- 8 entities. As noted above, local agencies' expenditures on IWM have comprised the largest component of
- all agency investments a trend that is expected to continue. Local agencies will continue to be
- primarily responsible for funding projects and programs that create local benefits and to participate in
- larger systemwide projects that benefit them.
- The role of State government in IWM is to fulfill its basic obligations, commitments, and responsibilities,
- as well as to invest in IWM innovation and infrastructure.

Basic Obligations

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- The obligations of State government include:
 - Representing California in government-to-government interactions with the federal government, other states, and other sovereign nations and tribal governments.
 - Meeting basic public health and safety needs for all Californians by regulating minimum
 public health standards and by providing assistance to communities that are unable to meet
 regulations.
 - **Protecting public trust resources** by regulation and in planning and allocation of water resources. The public trust doctrine recognizes that certain natural resources, including water, tide and submerged lands, the beds and banks of navigable rivers, and fish and wildlife resources, are owned by the public and held in trust for present and future generations of Californians.
 - **Protecting unique real property interests**. The State has a fundamental responsibility to California taxpayers to protect the real property assets owned by the State and reduce State liabilities.

Commitments and Responsibilities

- Operate and manage the State Water Project. State government is the owner and operator of the State Water Project (SWP) and has the responsibility (and contractual commitments) to provide reliable water supplies to the water contractors, the financiers and beneficiaries of the SWP.
- Plan, implement, and maintain the State Plan of Flood Control. State government has responsibility for providing assurances to construction access, operations, and maintenance for portions of the State's federally authorized flood protection system.
- **Planning, policy research, and technical assistance.** State government performs many critical planning and research activities in support of resource management (executive, legislative, and local government) decisions and advancing water science and technology.
- Integrate water rights and water quality planning. Basin Plans are prepared for each of the 10 hydrologic regions and by statute become part of the CWP.

Investing in Innovation and Infrastructure

- Investing in innovation and infrastructure is a shared responsibility across local, State, federal, tribal, and
- 3 private entities. State government has traditionally delegated IWM investment decisions to local
- 4 governments and regions. State government should continue to focus its investments within a framework
- 5 that empowers local governments and regions, supports regional decision-making, and encourages
- 6 regional self-reliance.

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- 7 State government should take a lead role in investing in innovation actions for the benefit of all regions.
- 8 Innovation includes a broad range of activities that comprises governance, planning and process
- 9 improvements, data, tools, and water technology research and development. The State's investment in
- innovation will provide processes and information that will aid decision-making throughout the state and
- support more cost-effective infrastructure investments by regional and local entities.
- The State invests in its own real property infrastructure (i.e., State Water Project and State-federal flood
- management system). The State also has a role in creating incentives for the planning, construction, and
- management of natural and human infrastructure in fulfillment of the State's strategic objectives. This is
- implemented throughout the state at various geographical and jurisdictional scales, including local,
- groundwater basin, watershed, regional, interregional, State, interstate, international and tribal. Although
- this infrastructure may be owned and operated by other entities, the State has a role in creating incentive
- that help achieve the State's goals.

The State's role in investing in innovation and infrastructure should be focused in the following four areas to provide:

- 1. What regions cannot accomplish on their own. The State has a role in assisting regions if they cannot accomplish necessary water management services on their own, such as providing basic public health and safety. The State predominantly delegates the responsibility to provide basic public health and safety needs for local governments to achieve while the State enforces regulations to ensure that minimum standards are met. However, the State has a role in assisting regions that cannot accomplish basic public health and safety needs on their own, such as disadvantaged communities or some tribal communities. The State can provide technical and financial assistance to these communities. In some circumstances, the State can also function as a service provider of last resort and provide these basic services itself when justified.
- 2. What involves interregional, interstate, or international issues. It is common for natural streams and infrastructure to cross regional, state, and international boundaries. In its role as representing California in government-to-government relationships, the State must take the lead in addressing international, interstate, or trans-boundary issues that extend beyond the geographical reach and jurisdictional authority of local and regional agencies. This includes, for example, negotiation with other states or Mexico regarding California's rights and interests in resources provided by the Colorado River. In addition to interstate and international issues, the State also has a role in promoting collaboration within and among regions for the benefit of the entire state.
- 3. What the State can do more efficiently. The State is uniquely suited to implement some activities more efficiently than other agencies or organizations because it can leverage resources and can provide economies of scale. The State has a responsibility to leverage these

- advantages to address specific needs common to all agencies involved in IWM. Information from these activities benefits the entire state. Operating on a statewide scale can also reduce inconsistencies or redundancies among regions. Examples of activities that the State can perform more efficiently and that provide value statewide include:
- A. **Facilitate process improvement and government agency alignment.** The State can play a major role in working with agencies to improve planning and project development processes.
- B. Provide regulatory oversight and alignment. The State is uniquely suited to provide regulatory oversight to protect public health and safety and public trust values including water quality, environmental protection, flood management, and dam safety through several State agencies. In addition to establishing, monitoring, and enforcing regulations, the State also has a role in promoting and facilitating alignment of regulatory processes involving federal and State regulations. Better interagency regulatory alignment helps improve consistency and predictability in regulatory standards and addresses unclear, conflicting, inconsistent, or mutually exclusive regulatory objectives or requirements for projects.
- C. Provide data, information, decision support, modeling tools, and expertise in specialty areas. The State is uniquely suited to collect, store, and disseminate water-resources-related data and information to support regional and statewide water system modeling, analytical tools, and decision support tools. State government expertise in specialty water resource areas should also be used to address the critical water-related issues of the state. (See Chapter 3, "California Water Today," for complete descriptions of water-related issues.) For example, State government expertise in climate change research should help monitor, predict, and prepare for the effects of climate change on California's water and flood protection systems and the environment.
- D. Conduct and coordinate public outreach and policy guidance on water-related issues. The State is uniquely suited to assist water agencies, local governments, tribes, and non-governmental organizations to educate the public and legislature on water issues. Providing a unified, coordinated message on key water issues can help convey their importance to the public and the legislature.
- E. **Facilitate systemwide management.** The State is uniquely suited to facilitate development and implementation of water projects that have impacts on a systemwide scale (i.e., across multiple regions of the state), such as major storage, large system flood management, and Delta improvements. Local agencies often are limited in their ability to work on a systemwide scale because of jurisdictional limitations. The State has more flexibility to assert leadership in interregional projects on a systemwide scale that spans geographic and agency boundaries. The State may therefore find it advantageous to incentivize local and regional projects that provide benefits to the state, but which may not be financially feasible at the local or regional level. For example, investing in a rural region located in an upper watershed may be the most cost-effective solution for increasing overall water supplies to the state, but local agencies within that region may lack the resources or may not find it in their interest to make that investment themselves.
- F. **Conduct statewide master planning.** The State is uniquely suited to conduct statewide master planning. This includes, for example, preparing CWP updates as a public forum to integrate State, federal, tribal, regional, and local plans to meet the state's future agricultural, urban, and environmental water demands and water management objectives.

4. What provides broad public benefits. The State has a role in promoting activities that have broad public benefits and in advancing sustainability through public safety, environmental stewardship, and economic stability. Public benefits are defined as very diffuse benefits that cannot be easily associated with specific user groups or a particular set of beneficiaries. This includes reducing environmental impacts created long ago, known as legacy impacts, which no longer have responsible parties to pay for mitigation.

How California decides to prioritize and pay for necessary water resource management improvements is

How California decides to prioritize and pay for necessary water resource management improvements is one of the most significant issues the state faces today. Past investments have provided a down payment and a good basis for further improvements; however, the financing methods of the past are no longer sustainable. The stakes are high as future investment decisions will significantly affect public safety, environmental stewardship, and economic stability. What is at stake includes flood risk to Californians' lives and assets; sustainability of natural resources, including the stewardship or extinction of species/habitats and the ecosystem services they can provide; and California's \$2 trillion economy, which has significant value, both nationally and globally, and directly affects the fate of existing businesses, their employees, and their employees' families.

The price tag for needed water resource management improvements is daunting, but failure to address these challenges will put more and more Californians at risk. We are beginning to integrate resource management and planning, but funding remains fragmented, unstable, and inefficient, which limits opportunities for further integration. In fact, many current funding practices and constructs, developed decades ago, drive investment priorities more so than emerging plans and stakeholder priorities (which have significantly changed over the last several decades). These rigid funding constructs also do not allow for the adaptability necessarily to respond to emerging challenges.

Update 2013 calls for more strategic, disciplined, and aligned investments in innovation and infrastructure and identifies shared stakeholder values and potential mechanisms for future financing. Moving forward, the State needs to clarify funding purposes, as well as assess and articulate the value of current and future expenditures, to secure the necessary investments that will deliver sustainable and resilient water resources, both natural and human-made. It will take decades to upgrade the aging water-related infrastructure and accomplish ecosystem improvements. However, we need to continue taking steps toward financing implementation of a diverse portfolio of water management actions with an equally diverse portfolio of funding sources, including self-funding, cost-sharing, and public benefit, as shown in Figure 2-7.

PLACEHOLDER Figure 2-7 Portfolio of Funding Sources

[Any draft tables, figures, and boxes that accompany this text for the public review draft are included at the end of the chapter.]

Self-Funding programs are primarily financed through revenue bond sales that are supported through users' fees. Many local major water-supply projects, including local and regional water-supply conveyance, treatment, distribution, and wastewater treatment, are included in this category. Some systemwide projects can also be included in this category. Small and isolated disadvantaged communities are one exception, as many of their water supply systems need upgrades to provide adequate water supply and/or address their water quality issues. Typically, local/regional water purveyors' and wastewater

agencies' user fees, with some exceptions, provide adequate funding for operation and maintenance of their water systems. Nonetheless, operation and maintenance of the flood management system by the State and local flood assessment districts is more challenging.

Cost-Sharing programs have local and regional benefits, as well as State and national benefits. Many of the proposed infrastructures fit within this category and are generally funded through a cost-shared agreement among the federal, State, and local agencies, depending on the program/project beneficiary. Examples of these types of projects include some regional water supply security projects and most flood protection projects. Many flood and community districts sell bonds secured by specific tax assessments to fund their capital improvements. Passage of AB 218 in 1996 put new restrictions on this type of financing by requiring approval by two-thirds of voters. The result has been delays in some capital improvements and failure to approve others.

Public benefit programs have statewide and societal benefits. They are generally supported by State and federal public funding. Examples of these projects are the systemwide ecosystem enhancements, systemwide flood-risk reduction projects, and some watershed management programs. Cities, counties, and the State generally finance their capital improvement programs through General Obligation bonds, which are secured by full faith of the credit issuer. Many local agencies and disadvantaged communities may not have adequate funding or means of financing local shares of their infrastructure improvement through bond sales (i.e., lack of credit or high interest rates). In these cases, providing low-interest State and/or federal loans to local agencies to cover their local cost share of the project will be helpful.

Integrated Water Management in Action

The immediate and changing conditions, priorities, and challenges described in Update 2013 require that Californians step up existing efforts to provide integrated, reliable, sustainable, and secure water resources and management systems for our health, public safety, economy, and ecosystems — today and for generations. The State needs to continue to invest in innovation and infrastructure, as detailed in Chapter 7, "Finance Planning Framework." To accomplish this requires implementing a strategic water plan with vision and goals, and an implementation plan with objectives and near-term and long-term actions. The plan must build on State and stakeholder accomplishments since Update 2009, as well as the fundamental lessons of water resource management learned in recent years. Figure 2-8 emphasizes how State, regional, and local entities must come together (align) to deliver the resources needed to effectively implement (invest in) IWM actions. Several key IWM activities are summarized (in the arrows located on the left side of Figure 2-8) for State, regional, and local government roles and investment. The roles of the respective government entities cannot be accomplished without significant new collaboration and alignment, particularly regarding international, interstate, statewide, and interregional IWM activities.

In Figure 2-8, the outcomes shown in the circle represent key accomplishments that must occur to achieve the Update 2013 IWM vision and objectives. Volume 1, Chapter 8, lays out 17 objectives and a menu of more than 250 actions that can move California toward accomplishing the desired outcomes. These outcomes will be tracked in future CWP updates and can be used to help guide, prioritize, track, and adaptively manage future State investment in IWM actions. Alignment, interaction, cooperation, and collaboration (shown around the circle of Figure 2-8) provide the catalyst needed for sustainable resource management.

1 PLACEHOLDER Figure 2-8 Integrated Water Management in Action 2 [Any draft tables, figures, and boxes that accompany this text for the public review draft are included at 3 the end of the chapter.] 4 References 5 References Cited 6 American Society of Civil Engineers. 2013. Failure to Act: The Economic Impact of Current Investment 7 Trends in Water & Wastewater Treatment Infrastructure. Prepared by Economic Development 8 Research Group, Inc., in association with Downstream Strategies. Reston (VA). 9 California Biodiversity Council. 2013. Strengthening Agency Alignment for Natural Resource 10 Conservation. Approved February 6, 2013. Davis (CA). 11 Das, T., M.D. D ettinger, D.R. Cayan, and H.G. Hidalgo. 2011. "Potential Increase in Floods in 12 Californian Sierra Nevada under Future Climate Projections." Climatic Change, doi: 13 10.1007/s10584-011-0298-z. 14 Pierce, D.W., P.J. Gleckler, T.P. Barnett, B.D. Santer, and P.J. Durack. 2012. "The Fingerprint of 15 Human-induced Changes in the Ocean's Salinity and Temperature Fields." Geophys. Res. Lett., 16 39, L21704, doi:10.1029/2012GL053389

Figure 2-1 Historical Droughts in California

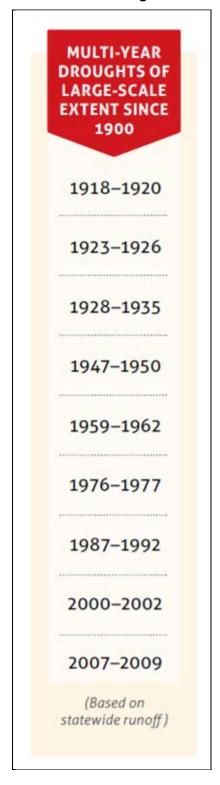


Figure 2-2 Types of Flooding



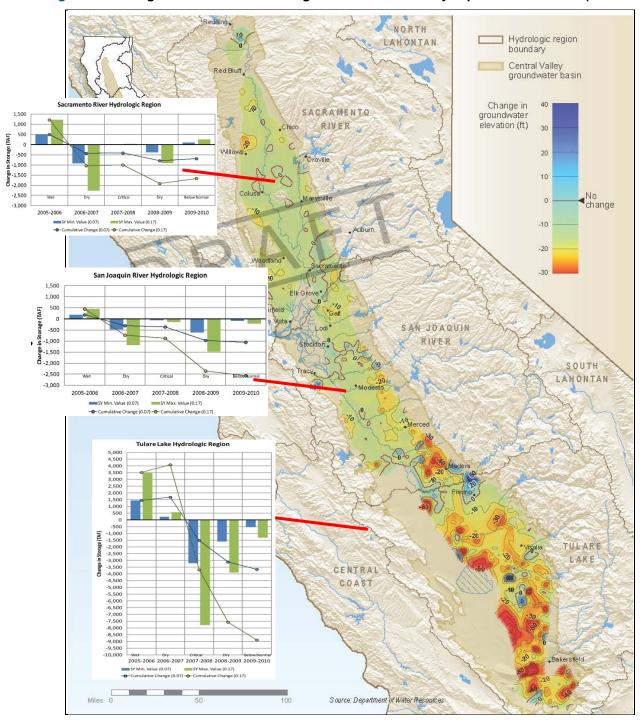


Figure 2-3 Change in Groundwater Storage in the Central Valley Aquifer of California (2005-2010)



Figure 2-4 Sensitive Species in Floodplains

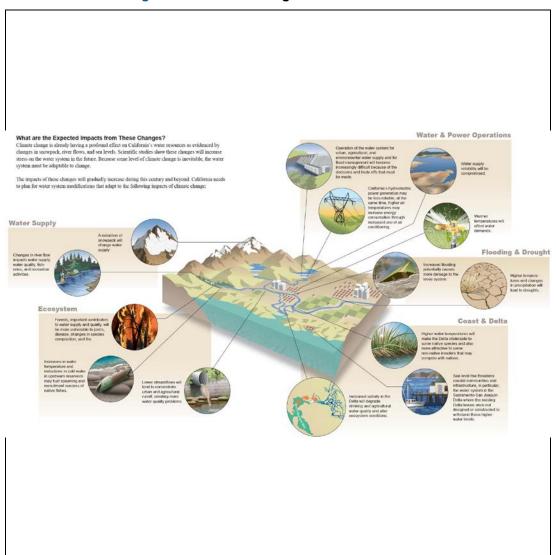


Figure 2-5 Climate Change Effects in California

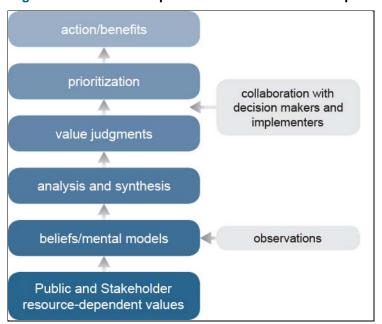


Figure 2-6 Water Plan Update 2013 Collaboration Graphic

Figure 2-7 Portfolio of Funding Sources

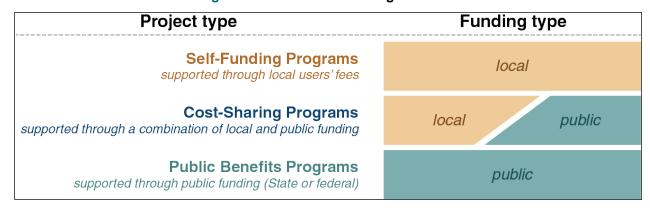
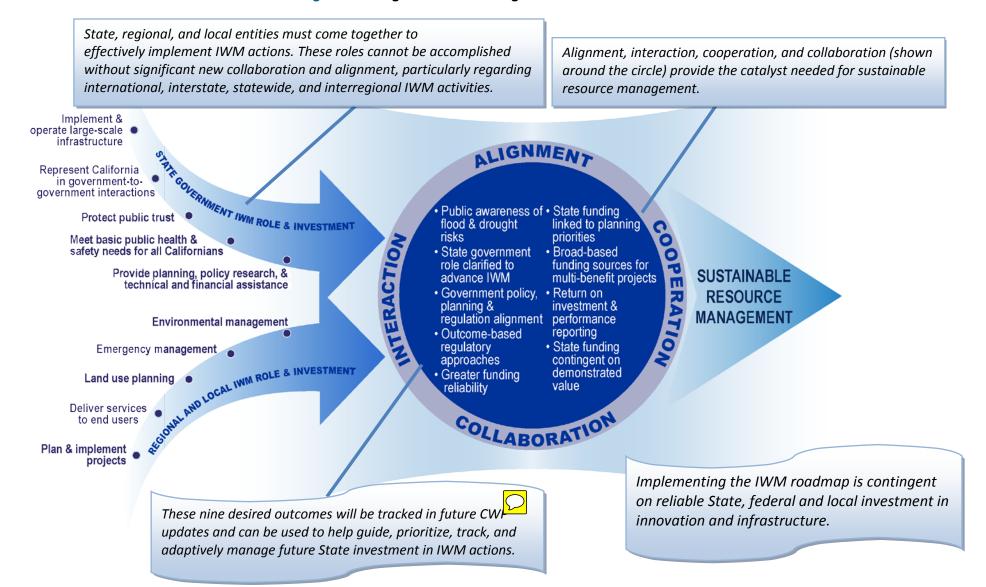


Figure 2-8 Integrated Water Management in Action



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Box 2-1 Integrated Water Management — What and Why

- Integrated Water Management (IWM) is a strategic approach to planning and implementing water management programs that *combines* flood management, ecosystem enhancement, and water supply actions to deliver multiple benefits *across watershed and jurisdictional boundaries*.
- The IWM approach maximizes limited resources to provide for increased public well-being.
- Well-implemented IWM projects *enjoy broader support* and thus are less likely to be delayed or stopped during the implementation phase.
- Fostering broader implementation of IWM is intended to improve or restore expected levels of service within flood and water management systems statewide, while also *improving system resiliency* (the ability of systems to respond to and recover from significant stressors).
- IWM program delivery will be conducted using measurable objectives that provide for accountability of public investment and transparency on the value that society will attain from investing in IWM initiatives.

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Box 2-2 IWM Desired Outcom

In addition to the four key concepts that enhance successful integrated water management (IWM), which are introduced in this chapter, the scope of IWM was further defined and clarified for Update 2013. The approach for such descriptions is expressed in terms of the matters of most importance (or desired benefits/outcomes) to stakeholders. The list below summarizes the types of desired outcomes that define the scope of IWM. For example, actions that produce one or more of these desired outcomes fall within the scope of IWM. A more detailed description of these topics is provided in Chapter 3, "California Water Today."

- Achieve environmental water quality objectives.
- · Control invasive species.
- · Control water-borne disease vectors.
- Create and sustain diverse portfolio of economic activity for each region.
- Create conditions for relaxation and refreshment of mind and body.
- Create diverse portfolio of climate change adaptation and mitigation strategies.
- · Enhance economic stability.
- Enhance efficiency of use of energy used to move and treat water.
- Ensure in-stream flows for restoration, a healthy ecosystem, fish population, and water temperature.
- · Facilitate access to safe drinking water for disadvantaged communities.
 - Facilitate human/nature connections.
 - Improve or maintain ambient water quality do no harm.
 - Improve water infrastructure (green and grey) levels of service.
- 21 · Improve water supply reliability.
 - Increase beneficial effects of flood for critical habitats.
 - Maintain a reasonably high standard of living and quality of life.
 - · Minimize greenhouse gas emissions in water management activities.
 - · Modify operations to meet existing or new objectives.
 - Provide the conditions to foster economic development and reliable utility services.
 - · Recover sensitive species.
 - · Reduce direct property damages resulting from floodwater.
- 29 · Reduce disaster recovery costs.
 - · Reduce high-severity wildfires.
 - · Reduce potential for loss of life.
 - Restore declining groundwater basins, reverse land subsidence, and maintain and improve ecosystem services provided by groundwater.
 - Sustain groundwater supplies and aquifers.
 - · Sustain the activities, culture/expertise, and overall capabilities to produce food and fiber in California.

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Box 2-3 California Biodiversity Council

The California Biodiversity Council (CBC) was formed in 1991 to improve coordination and cooperation among the various resource management and environmental protection organizations at federal, State, and local levels.

The CBC's initiative to improve the alignment of the plans, programs, policies, and regulations of its member agencies will enable the CBC to achieve its founding goals with:

- More consistent vision of desired conditions for natural resource management, conservation, and stewardship across California (less fragmented work in silos).
- More efficient and cost-effective planning and implementation of natural resource conservation projects (less duplication and waste).
- More holistic, watershed-scale policies and regulations (fewer agency conflicts).
- More outcome-based and regionally appropriate agency policies and regulations (focus on the What and less on How).
- Better sharing of information, expertise, and tools (less duplication by leveraging resources).
- Expedited conservation project implementation with more consistent and effective technical and financial assistance to project proponents (lower project cost and fewer delays).

In April 2013, the CBC renewed its commitment to agency alignment with their resolution, *Strengthening Agency Alignment for Natural Resource Conservation* (California Biodiversity Council 2013).

The resolution is formed around four goals:

- Increased coordination with all levels of government and agencies (federal, tribal, State, local), stakeholder groups, private landowners, and others.
- 2. Increased effectiveness through leveraging of existing networks, relationships, and multi-agency venues.
- 3. Improved sharing of data, information, tools, and science among governments and agencies.
- 4. Better alignment of planning, policies, and regulations across governments and agencies, as well as coordinated and streamlined permitting to increase regulatory certainty.

These goals are supported by guiding principles, practices, and tools, and recommended organizational improvements. See Volume 4, *Reference Guide*, for a copy of the resolution.

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- "Of all the infrastructure types, water is the most fundamental to life, and is irreplaceable. ... Much of the drinking-water infrastructure is old and in need of replacement. ...
- "Failures in drinking-water infrastructure can result in water disruptions, impediments to emergency response, and damage to other types of essential infrastructure."

Source: American Society of Civil Engineers 2013

2 Innovation: 3 Governance of State integrated water management (IWM) improvements. 4 Planning and public engagement improvements. 5 Information technology (data and analytical tools). 6 Government agency alignment improvements. 7 Water technology and science advancements. 8 Research, development, and implementation incentives. 9 Infrastructure (human and ecosystem), implemented at the following scales: 10 Local. 11 Groundwater basin. 12 Watershed. 13 Regional. 14 Interregional. 15 State. 16 Interstate.

Box 2-5 Categories of Integrated Water Management Investment

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International.

Tribal.